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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,693	01/05/2004	JON A. CASEY	FIS920030334US1	1692
29505	7590	07/11/2005		
DELIO & PETERSON, LLC 121 WHITNEY AVENUE NEW HAVEN, CT 06510			EXAMINER TOLEDO, FERNANDO L	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/707,693	Applicant(s) CASEY ET AL.	
	Examiner Fernando L. Toledo	Art Unit 2823	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/5/04 &amp; 1/22/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 18 is rejected under 35 U.S.C. 102(e) as being anticipated by Edelstein et al. (US Patent Application Publication US 2005/0121768 A1).

In re claim 18, Edelstein discloses placing said substrate in a vacuum chamber; drawing a vacuum in said vacuum chamber; flooding surfaces of said silicon substrate with a suspension; raising pressure in said vacuum chamber; wiping off excess suspension material; drying said silicon substrate; and sintering said substrate with filled vias (paragraphs 0036 – 0037).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1 –17 and 19 – 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edelstein et al. (US Patent Application Publication US 2005/0121768 A1) in view of Aoude et al. (U.S. Patent 5,337,475 A).

5. In re claims 1, 19 and 21, Edelstein discloses in the US Patent Application Publication US 2005/0151768 A1; figures 12C and related text, a method of filling vias in a silicon substrate, said method comprising; obtaining a silicon substrate having a plurality of via holes; filling said vias with a high-solids loading paste including a conductor material and a low CTE additive material; and sintering said silicon substrate and paste at a temperature for densification of said metal (Paragraphs 0031, 0033, 0036 and 0037).

Edelstein does not show that the sintering temperature does not densify the low CTE additive material. However, Aoude teaches that it is important that this does not occur so as not to melt the metal conductor (Column 3, Lines 1 – 5).

6. In re claims 2 and 22, Aoude teaches further comprising having said paste in the range of 50 to 55 volume percent solids (Column 4, Lines 8 – 28).

7. In re claims 3 and 23, Aoude discloses including filling said vias with a metal powder (Column 4, Lines 8 – 12).

8. In re claims 4 and 24, Aoude discloses wherein said metal powder comprises copper, silver or gold powder (Column 4, Lines 30 – 35).

9. In re claims 5 and 25, Aoude discloses further including adding solvents and dispersants said high-solids loading paste (Column 4, Lines 8 – 35).

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10. In re claims 6 and 26, Aoude discloses wherein said paste includes a high-solids loading of approximately greater than 50 to 55 volume percent solids (Column 4, Lines 8 – 35).
11. In re claims 7 and 27, Aoude discloses wherein said paste has a suspension viscosity below approximately 1000 centipoise (Column 4, Lines 24 – 28).
12. In re claims 8 and 28, Aoude discloses including filling with said low CTE additive comprising a conductor, an insulator, or mixture of both (Column 4, Lines 8 – 35).
13. In re claim 9, Aoude discloses wherein said low CTE additive material comprises glass (Column 4, Lines 8 – 18).
14. In re claims 10 and 29, Aoude discloses wherein said low CTE additive material comprises silica, corundum, spodumene, borosilicate glasses, mullite, beta eucryptite, tungsten, magnesium aluminosilicate, or molybdenum (Column 9, Line 6).
15. In re claims 11 and 30, Aoude discloses wherein said paste includes said low CTE additive material in a range of 20 – 80 volume percent (Column 4, Lines 30 – 35).
16. In re claim 12, Aoude discloses wherein said paste includes said low CTE additive material in a range of 50 – 75 volume percent (Column 4, Lines 30 – 35).
17. In re claims 13 and 30, Aoude discloses wherein said paste includes an amount of said conductor material is in the range of 20 – 80 volume percent (Column 4, Lines 30 – 35).
18. In re claim 14, Aoude discloses wherein said conductor material is in the range of 30 – 45 volume percent (Column 4, Lines 30 – 35).
19. In re claim 15, Aoude discloses including rheologically of said vias tailoring said paste to improve said filling by combining rheology modifiers (Column 4, Lines 8 – 38).

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20. In re claim 16, Aoude discloses including rheologically tailoring said paste by adding rheology modifiers on the order of 0.1 volume percent (Column 4, Lines 8 – 38).

21. In re claims 17 and 20, Aoude discloses wherein said sintering temperature of said conductor material is approximately 100°C less than said low CTE additive material sintering temperature (Column 11, Lines 5 – 15).

22. In re claim 18, Edelstein discloses placing said substrate in a vacuum chamber; drawing a vacuum in said vacuum chamber; flooding surfaces of said silicon substrate with a suspension; raising pressure in said vacuum chamber; wiping off excess suspension material; drying said silicon substrate; and sintering said substrate with filled vias (paragraphs 0036 – 0037).

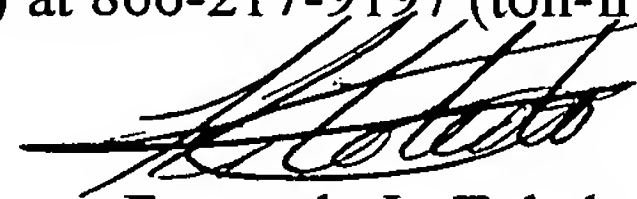
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Fernando L. Toledo  
Examiner  
Art Unit 2823

flt  
8 July 2005